

**CLAIMS**

It is claimed:

1. A method for increasing the throughput of network communications comprising:
  - receiving a response from a server
  - reviewing the response to determine whether the response includes a native expiration
  - when the response does not include the native expiration
    - computing a computed expiration for the response
    - inserting the computed expiration into the response creating an amended response
  - forwarding the amended response to a requester.
2. The method of claim 1 wherein the server comprises an origin server.
3. The method of claim 1 further comprising:
  - receiving a request for an object from the requester
  - forwarding the request to the server
  - storing the amended response
  - providing the amended response to other requesters that request the object, the providing achieved without additional communication with the server.
4. The method of claim 1 wherein

when the response includes the native expiration, forwarding the response to the requester.

5. The method of claim 1 wherein the computed expiration is based on at least one of a response content type and a response resource identifier.
6. The method of claim 1 wherein the computed expiration is based on a time-to-live.
7. The method of claim 1 further comprising  
evaluating whether a content type of the response is appropriate  
performing the reviewing only when the content type of the response is appropriate.
8. The method of claim 7 wherein the evaluating whether a content type of the response is appropriate comprises checking to determine whether the content type is in an appropriate type list.
9. The method of claim 8 wherein the appropriate type list comprises at least one of graphic, JavaScript, Cascading Style Sheet, portable document format (PDF), executable program, audio, video, and multimedia.
10. The method of claim 3 wherein the receiving a request comprises storing request information as request history data.

**11.** The method of claim 10 wherein the request information includes a request resource identifier, a request content type, and a modification query when the modification query is present.

**12.** The method of claim 10 wherein the computing the computed expiration comprises:

evaluating whether the response includes a modification history

when the response includes the modification history,

computing a time-to-live for the response based on an age factor, a current time and a value of the modification history

computing the computed expiration based on the current time and the time-to-live

when the response does not include the modification history,

retrieving a modification query value from the request history data based on a response type and a response location

when the modification query value is retrieved,

computing the time-to-live for the response based on an age factor, a current time and the modification query value,

computing the computed expiration based on the current time and the time-to-live

when the retrieving the modification query value is not successful,

forwarding the response to the requester.

**13.** The method of claim 12 further comprising:

when the time-to-live is greater than a defined maximum, setting the time-to-live to be the defined maximum

when the time-to-live is less than a defined minimum, forwarding the response to the requester.

**14.** The method of claim 13 wherein the request is a hyper-text transfer protocol (HTTP) get, the modification query value is an HTTP if-modified-since value, and the modification history value is an HTTP last-modified value.

**15.** A method for increasing the throughput of network communications comprising:

receiving a response from a server

evaluating whether the response has a status code that is actionable

when the status code is actionable,

reviewing the response to determine whether the response includes a native expiration

when the response does not include the native expiration

calculating a calculated expiration for the response

inserting the calculated expiration into the response creating an amended response

forwarding the amended response to a requester

when the response includes the native expiration, forwarding the response to the requester

when the status code is not actionable, forwarding the response to the requester.

**16.** The method of claim 15 wherein evaluating whether the response has a status code that is actionable comprises checking to determine whether the response has a hyper-text transfer protocol (HTTP) status code of “OK” or “Not Modified”.

**17.** The method of claim 15 further comprising:

receiving a request for an object from the requester

forwarding the request to the server

storing the amended response

providing the amended response to other requesters that request the object, the

providing achieved without additional communication with the server.

**18.** A method for increasing the throughput of network communications comprising:

receiving a response from a server

reviewing the response to determine whether the response includes a native

expiration

when the response does not include the native expiration

evaluating whether a content type of the response is appropriate

when the content type of the response is appropriate

computing a calculated expiration for the response

inserting the calculated expiration into the response creating an

amended response

forwarding the amended response to the requester  
when the content type of the response is not appropriate,  
forwarding the response to the requester  
when the response includes the native expiration,  
forwarding the response to the requester.

**19.** The method of claim 18 wherein the evaluating whether a content type of the response is appropriate comprises checking to determine whether the content type is a graphic image.

**20.** The method of claim 19 wherein the evaluating whether a content type of the response is appropriate comprises checking to determine whether the content type is one of a Graphics Interchange Format (GIF) file or Joint Photographic Experts Group (JPEG) file.

**21.** The method of claim 18 wherein the evaluating whether a content type of the response is appropriate comprises checking to determine whether the content type is in an appropriate type list.

**22.** The method of claim 21 wherein the appropriate type list comprises at least one of graphic, JavaScript, Cascading Style Sheet, portable document format (PDF), audio, video, and multimedia.

**23.** The method of claim 18 wherein the calculated expiration is based on at least one of a response content type and a response resource identifier.

**24.** The method of claim 18 wherein the calculated expiration is based on a time-to-live.

**25.** The method of claim 18 further comprising:

receiving a request for an object from the requester

forwarding the request to the server

storing the amended response

providing the amended response to other requesters that request the object, the

providing achieved without additional communication with the server.

**26.** The method of claim 25 wherein the receiving a request comprises storing request information as request history data.

**27.** The method of claim 26 wherein the request information includes a request resource identifier, a request content type, and a modification query when the modification query is present.

**28.** The method of claim 26 wherein the calculating the calculated expiration comprises:

evaluating whether the response includes a modification history

when the response includes the modification history,

computing a time-to-live for the response based on an age factor, a current time and a value of the modification history

calculating the calculated expiration based on the current time and the time-to-live

when the response does not include the modification history,

retrieving a modification query value from the request history data based on a response type and a response location

when the modification query value is retrieved,  
    computing the time-to-live for the response based on an age  
factor, a current time and the modification query value,  
    calculating the calculated expiration based on the current time  
and the time-to-live  
when the retrieving the modification query value is not successful,  
    forwarding the response to the requester.

**29.** The method of claim 28 further comprising:

    when the time-to-live is greater than a defined maximum, setting the time-to-live to be the defined maximum

    when the time-to-live is less than a defined minimum, forwarding the response to the requester.

**30.** The method of claim 28 wherein the request is a hyper-text transfer protocol (HTTP) get, the modification query value is an HTTP if-modified-since value, and the modification history value is an HTTP last-modified value.

**31.** A storage medium having instructions stored thereon which when executed by a processor cause the processor to perform operations comprising:

    receiving a response from a server

    reviewing the response to determine whether the response includes a native expiration

    when the response does not include the native expiration



computing a computed expiration for the response  
inserting the computed expiration into the response creating an  
amended response  
forwarding the amended response to a requester.

**32.** The storage medium of claim 31 wherein the server comprises an origin server.

**33.** The storage medium of claim 31 having further instructions which when executed cause the processor to perform further operations comprising:

evaluating whether a content type of the response is appropriate  
performing the reviewing only when the content type of the response is  
appropriate.

**34.** The storage medium of claim 33 wherein the evaluating whether a content type of the response is appropriate comprises checking to determine whether the content type is in an appropriate type list.

**35.** The storage medium of claim 34 wherein the appropriate type list comprises at least one of graphic, JavaScript, Cascading Style Sheet, portable document format (PDF), audio, video, and multimedia.

**36.** The storage medium of claim 31 having further instructions which when executed cause the processor to perform operations further comprising:

receiving a request for an object from the requester  
forwarding the request to the server

storing the amended response

providing the amended response to other requesters that request the object, the providing achieved without additional communication with the server.

**37.** The storage medium of claim 31 wherein

when the response includes the native expiration, forwarding the response to the requester.

**38.** The storage medium of claim 31 wherein the computed expiration is based on at least one of a response content type and a response resource identifier.

**39.** The storage medium of claim 31 wherein the computed expiration is based on a time-to-live.

**40.** The storage medium of claim 36 wherein the receiving a request comprises storing request information as request history data.

**41.** The storage medium of claim 40 wherein the request information includes a request resource identifier, a request content type, and a modification query when the modification query is present.

**42.** The storage medium of claim 40 wherein the computing the computed expiration comprises:

evaluating whether the response includes a modification history

when the response includes the modification history,

computing a time-to-live for the response based on an age factor, a current time and a value of the modification history

computing the computed expiration based on the current time and the time-to-live

when the response does not include the modification history,

retrieving a modification query value from the request history data based on a response type and a response location

when the modification query value is retrieved,

computing the time-to-live for the response based on an age factor, a current time and the modification query value,

computing the computed expiration based on the current time and the time-to-live

when the retrieving the modification query value is not successful,

forwarding the response to the requester.

**43.** The storage medium of claim 42 having further instructions stored thereon which when executed cause the processor to perform operations further comprising:

when the time-to-live is greater than a defined maximum, setting the time-to-live to be the defined maximum

when the time-to-live is less than a defined minimum, forwarding the response to the requester.

**44.** The storage medium of claim 43 wherein the request is a hyper-text transfer protocol (HTTP) get, the modification query value is an HTTP if-modified-since value, and the modification history value is an HTTP last-modified value.

**45.** A computing device configured to accelerate network traffic delivery, the computing device comprising:

- a processor
- a memory coupled with the processor
- a storage medium having instructions stored thereon which when executed cause the computing device to perform actions comprising
  - receiving a response from a server
  - reviewing the response to determine whether the response includes a native expiration
  - when the response does not include the native expiration
    - computing a computed expiration for the response
    - inserting the computed expiration into the response creating an amended response
    - forwarding the amended response to a requester.

**46.** The computing device of claim 45 wherein the server comprises an origin server.

**47.** The computing device of claim 45 having further instructions which when executed cause the processor to perform further operations comprising:

- evaluating whether a content type of the response is appropriate

performing the reviewing only when the content type of the response is appropriate.

**48.** The computing device of claim 47 wherein the evaluating whether a content type of the response is appropriate comprises checking to determine whether the content type is in an appropriate type list.

**49.** The computing device of claim 48 wherein the appropriate type list comprises at least one of graphic, JavaScript, Cascading Style Sheet, portable document format (PDF), audio, video, and multimedia.

**50.** The computing device of claim 45 wherein the storage medium has further instructions stored thereon which when executed cause the computing device to perform further operations comprising:

receiving a request for an object from the requester

forwarding the request to the server

storing the amended response

providing the amended response to other requesters that request the object, the

providing achieved without additional communication with the server.

**51.** The computing device of claim 45 wherein

when the response includes the native expiration, forwarding the response to the requester.

**52.** The computing device of claim 45 wherein the computed expiration is based on at least one of a response content type and a response resource identifier.

**53.** The computing device of claim 45 wherein the computed expiration is based on a time-to-live.

**54.** The computing device of claim 50 wherein the receiving a request comprises storing request information as request history data.

**55.** The computing device of claim 54 wherein the request information includes a request resource identifier, a request content type, and a modification query when the modification query is present.

**56.** The computing device of claim 54 wherein the computing the computed expiration comprises:

evaluating whether the response includes a modification history

when the response includes the modification history,

computing a time-to-live for the response based on an age factor, a

current time and a value of the modification history

computing the computed expiration based on the current time and the

time-to-live

when the response does not include the modification history,

retrieving a modification query value from the request history data

based on a response type and a response location

when the modification query value is retrieved,  
    computing the time-to-live for the response based on an age  
factor, a current time and the modification query value,  
    computing the computed expiration based on the current time  
and the time-to-live  
when the retrieving the modification query value is not successful,  
forwarding the response to the requester.

**57.** The computing device of claim 56 wherein the storage medium has further instructions stored thereon which when executed cause the computing device to perform further operations comprising:

    when the time-to-live is greater than a defined maximum, setting the time-to-live to be the defined maximum

    when the time-to-live is less than a defined minimum, forwarding the response to the requester.

**58.** The computing device of claim 57 wherein the request is a hyper-text transfer protocol (HTTP) get, the modification query value is an HTTP if-modified-since value, and the modification history value is an HTTP last-modified value.